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LISTS OF SPECIES

Freshwater Fishes, *Ilha de Santa Catarina*, southern coastal drainage of the state of Santa Catarina, Brazil

Vinicius A. Bertaco[1]

[1]*Universidade Federal do Rio Grande do Sul, Departamento de Zoologia. Avenida Bento Gonçalves, 9500. CEP 91501-970. Porto Alegre, RS, Brazil.*

E-mail: vbertaco@gmail.com

Abstract: The *ilha de Santa Catarina* is situated in southern Brazil, Atlantic Forest, in the state of Santa Catarina, municipality of Florianópolis. Fish specimens were collected in 15 sampling points along the drainages of *rio Córrego Grande*, *rio Palha*, *rio Ratones*, *rio Tavares*, *rio Vermelho*, as well as in the channel of *lagoa do Peri*. Specimens belonging to 16 species (one of them exotic) were collected, distributed in 12 families and six orders.

Introduction

The coastal rivers of the Atlantic Forest, in southeastern and southern Brazil, contain a rich and diversified fish fauna, with a remarkable number of endemic species (Bizerril 1994). These river basins are basically composed of streams and small rivers, inhabited mainly by small-sized fish species (Castro 1999).

Ilha de Santa Catarina (Santa Catarina island) is located in the remnants portions of the Atlantic Forest in southeastern Brazil, a biome strongly impacted by deforestation and pollution caused by increased urbanization (Menezes et al. 2007). The island contains various small streams, and the most important basin is that of *rio Ratones*, situated in the northwestern region. *Rio Ratones* drainage is the most extensive on *ilha de Santa Catarina*, and nowadays, it is degraded with its tributaries suffering from erosion and domestic pollution.

The freshwater ichthyofauna of the *ilha de Santa Catarina* river basins is poorly known, and inventories are nonexistent. Due to the lack of information about the freshwater fishes of the island, the objective of this study is to provide an initial preliminary list of species of some river basins of the island, which may eventually support future studies on fish biology and conservation.

Material and methods

Specimens were collected using a dip net (40 x 80 cm frame and 1 mm net mesh size) in October 2001, and in February, April and June 2005. Fishes were collected under IBAMA (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*) permits (# 31/2000 and 54/2004). Fifteen sampling points were made in the small freshwater streams from *ilha de Santa Catarina*. A total of 19 samples were made, but in four different sites the samples were repeated (one in the *rios Palha* and *Tavares*, and two in the *rio Ratones* basins). As many as possible habitats were explored in each sampling point. The fish specimens were fixed in 10 % formalin and preserved in 70 % alcohol and were identified using pertinent literature and keys (Britski and Garavello 1984; Menezes et al. 2003; 2007; Britto and Reis 2005; Costa 2006; Lucinda and Costa 2007; Carvalho et al. 2008; Lucinda 2008; Oyakawa and Mattox 2009).

Voucher specimens are deposited in *Coleção de Peixes do Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul*, Porto Alegre (MCP). The classification of fishes followed Reis et al. (2003).

The 15 sampling points were made in the following streams and rivers: *rio Ratones* basin (27°29'54" S, 48°27'43" W; 27°30'11" S, 48°27'27" W; 27°31'15" S, 48°27'59" W; 27°30'31" S, 48°29'33" W; 27°30'40" S, 48°29'11" W and 27°30'13" S, 48°29'30" W); *rio Palha* basin (27°28'59" S, 48°26'14" W and 27°28'35" S, 48°26'36" W); *rio Vermelho* basin (27°28'59" S, 48°25'23" W and 27°27'40" S, 48°24'57" W);

Córrego Grande basin (27°36'35" S, 48°30'23" W; 27°35'17" S, 48°28'39" W and 27°35'44" S, 48°29'30" W); *rio Tavares* basin (27°41'06" S, 48°31'07" W), and *Lagoa do Peri* channel (27°44'19" S, 48°30'37" W) (Figure 1).

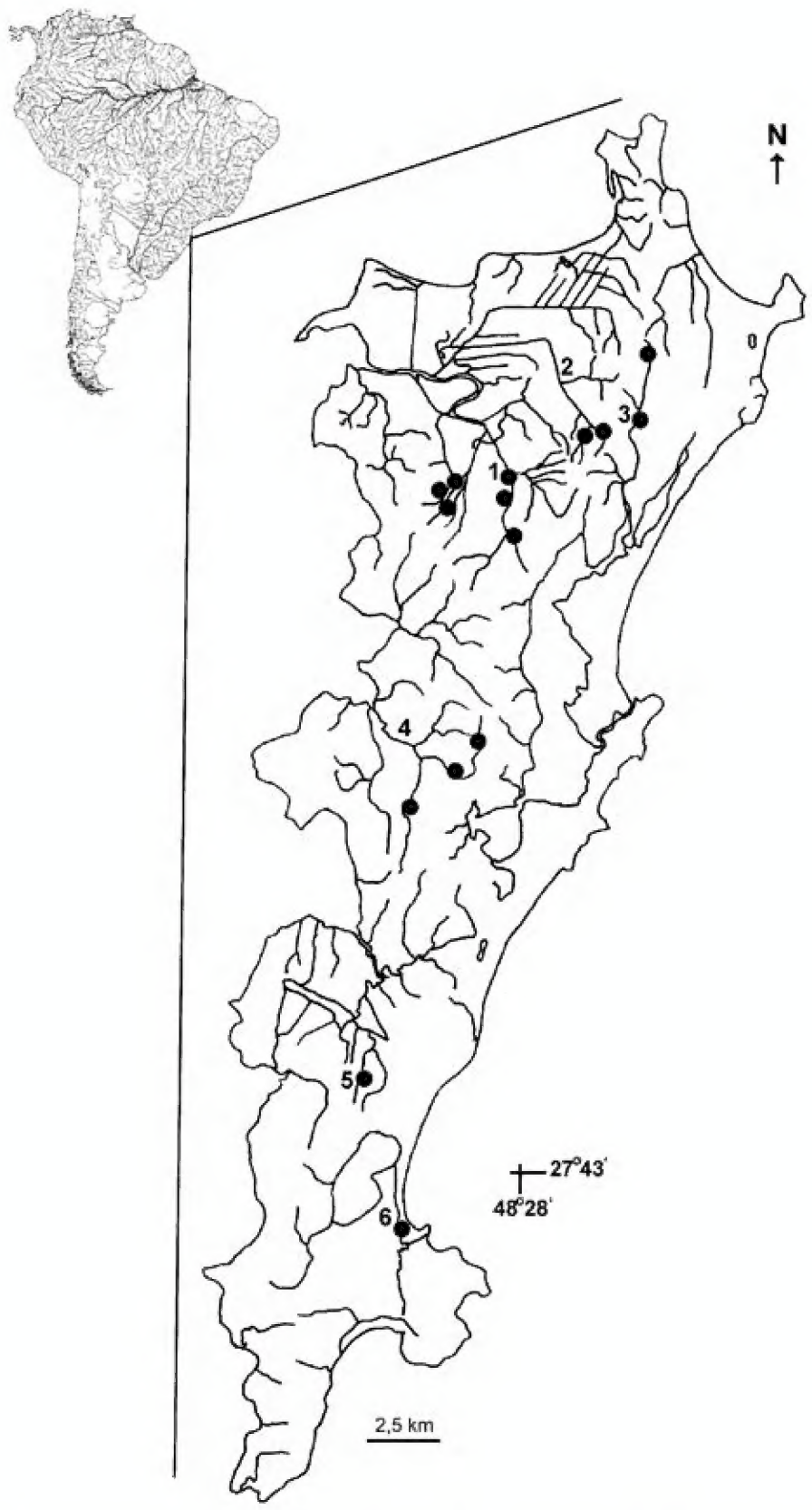

Figure 1. *Ilha de Santa Catarina* showing the sampled points. 1- *Rio Ratones* basin; 2- *Rio Palha* basin; 3- *Rio Vermelho* basin; 4- *Córrego Grande* basin; 5- *Rio Tavares* basin; 6- *Lagoa do Peri* channel.

Results and discussion

Seven hundred and fifteen fish specimens, belonging to six orders, 12 families, 15 genera and 16 species were collected (Table 1). Among the specimens collected, 31.2 % were Characiformes, 25.0 % Siluriformes, 25.0 % Cyprinodontiformes, 12.5 % Perciformes, and 6.2 % Gymnotiformes. The most abundant species was *Phalloceros harpagos* (60.14 %), followed by *Hollandichthys* sp. (18.46 %) (Table 2). According to Lowe-McConnell (1999), the predominance of the Characiformes and Siluriformes seems to be a trend for Neotropical rivers.

The sampled specimens belong to 15 native species and one allochthonous or exotic species. The exotic species is *Poecilia reticulata* originally distributed in coastal drainages of Venezuela (Lucinda and Costa 2007). Those authors believe that *P. reticulata* was introduced in various countries, including Brazil, for the biological control of insects (e.g., mosquitoes). The species *Poecilia reticulata* and *P. vivipara* were mainly found in freshwater, but also occurred in brackish water, as the marine species *Dormitator maculatus*.

Four species were provisionally identified given their uncertain taxonomic status or because they represent undescribed species (e.g. *Hollandichthys* sp., which is under description by the author). *Hollandichthys* sp. also occurs in the river basins on the continent near the island. Recently, Britto and Reis (2005) described *Scleromystax salmacis* based on specimens collected in the *rio Ratones* basin during this study. This species also occurs in the *rio Mampituba* and *rio Araranguá* basins in southern state of Santa Catarina. All remaining collected species also occur in inland Atlantic coastal basins, except species with unknown distribution range and/or uncertain taxonomic status: *Astyanax* sp., *Characidium* sp., and *Trichomycterus* sp.

Most specimens (except *Rhamdia* aff. *quelen* specimens) collected in the streams are small-sized (total length smaller than 20 cm), which agrees with the fish fauna often observed in the coastal streams of Brazil (Castro 1999).

The results indicate the poor level of taxonomic knowledge about the freshwater ichthyofauna of this region. Some streams, mainly in the northern and central regions of the island (*rios Ratones* and *córrego Grande* basins), have been highly impacted by domestic effluents and deforestation of the original riparian forest due to urbanization. Such alterations associated with physical stream modifications can cause the extinction of some species (even before their formal description) through a combination of habitat alteration and pollution (Menezes et al. 2007). Therefore, taxonomic, systematic and biological studies as well as conservation efforts on the ichthyofauna are largely encouraged in this area.

During collecting expeditions, *Hollandichthys* sp. specimens were only captured in well-preserved environments or small refuges of still forested places, with transparent and shallow lentic water, and sand and ooze bottom, indicating their great dependence on the forest, which provides favorable conditions for their life cycle. Sabino and Castro (1990) observed the dependence of *Hollandichthys* from *rio Indaiá* (Ubatuba, state of São Paulo) on forested streams mainly due to its feeding habits, since it basically feeds on terrestrial arachnids and insects from the forest. Recently, Abilhoa et al. (2009) described the feeding habitats of a population of *Hollandichthys* sp. from forest streams in São Francisco do Sul island, state of Santa Catarina, and also observed the dependence on food items originated from forest. In each of the sampling points where *Hollandichthys* sp. specimens were collected, several specimens of *Phalloceros harpagos* (the most abundant and frequent species among all samples) were also collected, indicating that there is some relationship between these species or that they probably share a similar preferential habitat. *Geophagus brasiliensis*, *Gymnotus pantherinus*, *Hoplias malabaricus*, and *Pseudotothyris obtusa* were also collected together with *Hollandichthys* sp. and *Phalloceros harpagos*, but less abundantly. Therefore, it is urgent to sample and document the diversity of these areas, mainly the river basins of northern side of the island (Ratones and Palha rivers basins), where urbanization is rapidly modifying the natural communities. It is also urgent to preserve the marginal forest streams of Atlantic rainforest biome in order to maintain the vital cycle of fishes species.

Table 1. Fish species from freshwater streams of *ilha de Santa Catarina*, southern coastal drainage. An exotic species is labeled with asterisk. Popular names follows the current literature.

Order / Family / Subfamily	Species / popular name
Characiformes	**5 spp.**
Crenuchidae	*Characidum* sp. - canivete
Characidae	*Astyanax* sp. - lambari
	Hollandichthys sp. - lambari-listrado
	Hyphessobrycon boulengeri (Eigenmann, 1907) - lambari
Erythrinidae	*Hoplias* aff. *malabaricus* (Bloch, 1794) - traíra
Siluriformes	**4 spp.**
Trichomycteridae	*Trichomycterus* sp. - cambeva
Callichthyidae	*Scleromystax salmacis* Britto & Reis, 2005 - cascudinho-limpa-fundo
Loricariidae	*Pseudotothyris obtusa* (Miranda-Ribeiro, 1911) - cascudinho
Heptapteridae	*Rhamdia* aff. *quelen* (Quoy & Gaimard, 1824) - jundiá
Gymnotiformes	**1 spp.**
Gymnotidae	*Gymnotus pantherinus* (Steindachner, 1908) - tuvira
Cyprinodontiformes	**4 spp.**
Rivulidae	*Kryptolebias caudomarginatus* (Seegers, 1984)
Poeciliidae	*Phalloceros harpagos* Lucinda, 2008 - barrigudinho
	*Poecilia reticulata** Peters, 1859 - guppy
	Poecilia vivipara Bloch & Schneider, 1801 - guppy
Perciformes	**2 spp.**
Cichlidae	*Geophagus brasiliensis* (Quoy & Gaimard, 1824) - cará
Eleotridae	*Dormitator maculatus* (Bloch, 1792) - barrigudo

Table 2. Distribution of fish species by drainage basins, number of specimens (N) and proportions (%) per species collected in *ilha de Santa Catarina*. Species listed in alphabetic order. 1- *rio Ratones* basin; 2- *rio Palha* basin; 3- *rio Vermelho* basin; 4- *córrego Grande* basin; 5- *rio Tavares* basin; 6- *lagoa do Peri* channel.

Species	1	2	3	4	5	6	N	%
Astyanax sp.				X			4	0.56
Characidium sp.	X	X					3	0.42
Dormitator maculatus						X	1	0.14

Species	1	2	3	4	5	6	N	%
Geophagus brasiliensis	X	X	X	X		X	20	2.80
Gymnotus pantherinus	X						2	0.28
Hollandichthys sp.	X	X	X	X			132	18.46
Hoplias aff. *malabaricus*			X				1	0.14
Hyphessobrycon boulengeri					X		19	2.66
Kryptolebias caudomarginatus					X		3	0.42
Pseudothothyris obtusa		X					16	2.24
Phalloceros harpagos	X	X	X	X	X	X	430	60.14
Poecilia vivipara	X					X	12	1.68
Poecilia reticulata				X			34	4.75
Rhamdia aff. *quelen*	X			X			7	0.98
Scleromystax salmacis	X	X					30	4.19
Trichomycterus sp.				X			1	0.14
Total							**715**	**100**

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Appendix 1. Voucher specimens.

Astyanax sp.: MCP 37620, 2; MCP 37631, 1. *Characidium* sp.: MCP 28746, 1; MCP 37615, 2. *Geophagus brasiliensis*: MCP 28733, 1; MCP 37607, 3; MCP 37629, 5. *Dormitator maculatus*: MCP 38324, 1. *Gymnotus pantherinus*: MCP 38325, 2. *Hollandichthys* sp.: MCP 28732, 11; MCP 28737, 39; MCP 28747, 7; MCP 37633-37635 (9, 12, 9); MCP 37654, 14. *Hoplias* aff. *malabaricus*: MCP 38322, 1. *Hyphessobrycon boulengeri*: MCP 37774, 15. *Kryptolebias caudomarginatus*: MCP 38323, 2. *Phalloceros harpagos*: MCP 28728, 21; MCP 28736, 19; MCP 28738, 59; MCP 28745, 10; MCP 37611, 45. *Poecilia reticulata*: MCP 37622, 23; MCP 37630, 30. *Poecilia vivipara*: MCP 37612, 10. *Pseudotothyris obtusa*: MCP 37651, 16. *Rhamdia* aff. *quelen*: MCP 28727, 5. *Scleromystax salmacis*: MCP 28729, 25; MCP 28744, 4. *Trichomycterus* sp.: MCP 37621, 1.